

Serial No.: 09/926,494
Atty. Docket No.: P67265US0

REMARKS

This is in response to the first Office Action of July 11, 2003 (Paper No. 8). By this Amendment, claims 1-15, 17 and 18 have been amended, claims 23 and 24 have been canceled and new claims 33 and 34 have been added. Thus, claims 1-22, 25-30 and 33-34 are in the application for examination. Claims 1, 25 and 33 are in independent form.

Filed separately herewith is a Petition for Extension of Time along with a check in the amount of \$110.00. If the amount is in error, the Patent and Trademark Office is authorized to debit or credit, as appropriate, the undersigned attorney's Deposit Account No. 06-1358.

At the request of the Examiner, the specification has been amended to include headings and a section entitled "Brief Description of the Drawings" is also provided. The Examiner's objection to the drawing as failing to show the elements of claim 7 has now been overcome by the submission of new Fig. 8.

Claims 23 and 24 have been canceled without prejudice or disclaimer reserving the right to file divisional applications thereto. Thus, the rejections and objections to such claims are now moot.

In the first Office Action, claims 1-17 and 20-22 were rejected as unpatentable over Barnes et al., (WO 98/25313). Reconsideration is respectfully requested. The Examiner stated that the phrase "adapted to manipulate emission and/or propagation of light by coupling non-radiative waveguide-modes to far-field radiation" has been given no patentable weight since it is considered an intended use recitation. Reconsideration is respectfully requested in view of the inclusion of the "means" phrase and the fact that the claimed restrictions are clearly definitions of material and are

structural properties. Although these properties may be defined in part by terms directed to the function of the material and/or structure in use, the material and structural properties remain, fundamentally, objective and measurable material and/or structural properties. The person skilled in the art would understand that defining the features on the basis of material behavior with reference to use is the most practical and convenient way of doing so. It is certainly possible to determine those structures which comply with these features and to determine those structures which do not.

For example, the quoted description that the Examiner has chosen to ignore is not a description of how the periodic microstructure is used but, rather, of what it is. The restriction describes a material property of the microstructured feature which is objectively determinable. This property is not described in the prior art of record.

The present invention is not obvious over the Barnes et al. reference. The mechanism of the Barnes et al. reference and the present invention is fundamentally distinct and the consequent structures are distinct and would not be interchangeable. The prior art Barnes et al. reference and the present invention both relate to the general problem of dealing with efficiency losses attributable to non-radiative waveguide modes in LED structures. However the present invention solves the problem by coupling these non-radiative modes to far-field modes. By contrast, Barnes et al attempts to improve emission by blocking waveguide modes rather than by coupling the waveguide modes out directly.

A person skilled in the art would clearly understand from the disclosures of the prior art and the present invention that they are fundamentally different mechanisms requiring fundamentally

distinct microstructures. For a given LED, for example, different periodicity is required. To couple the guided mode in the manner of the present invention, the periodicity needs to be close to the effective wavelength of the guided mode. To block a waveguide mode, as in the prior art, the periodicity needs to be close to half of the effective wavelength of the guided mode in question. A person skilled in the art would understand this distinction and would be able to calculate the necessary periodicities for a given wavelength mode from the available general knowledge.

Applying the mechanism of the present invention rather than the prior art confers significant advantages. In particular, there is no requirement for a photonic band gap in the wavelength ranges associated with emission and typical LED structures. This is likely to greatly increase the tolerances permissible in the structure while still obtaining adequate function. In particular there is no need for the drastic modulation of refracted index which is provided for in Barnes et al. by the difference between the dielectric and the metal layer.

The lesser design constraints of the present invention are likely to lead to simpler fabrication processes being available. For example, the present application specifies a preferred method in which the device is produced using an embossing process allowing for inexpensive and quick mass production.

Newly added claims 33 and 34 provide specific structures that are distinguishable from the prior art.

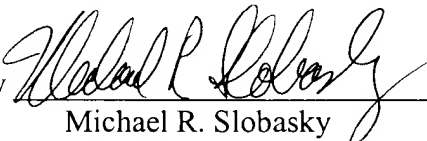
The Examiner rejected claims 1 and 18-19 as unpatentable over Joannopoulos et al. (WO 98/25314). This reference does not disclose the structural limitations as now claimed.

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Thus, this application is now in condition for allowance. Should the Examiner have any questions after reviewing this Amendment, the Examiner is cordially invited to telephone the undersigned attorneys so that a prompt Notice of Allowance may be received.

Respectfully submitted,

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